



ESG Factors & REIT Performance: A Case Study on US REITs

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Abstract

Real Estate Investment Trusts (REITs) have been encouraged to actively invest in CSR and ESG-related activities despite their significant financial cost. The existing empirical evidence shows mixed results, with several researchers advocating to increase ESG investment following the logic that it significantly enhances market performance, reputation, and profitability of the company. However, evidence also exists illustrating an insignificant relationship between ESG factors and firm performance. This study aims to understand the effect of investment into ESG factors on REITs performance in U.S. markets by taking net assets value (NAV), price to funds from operations (PFFO) and closing stock price as performance indicators.

I find my results consistent with the existing literature showing that, in some cases, ESG factors have a significant positive impact on REITs' performance indicators; however, when profitability, firm size and leverage are accounted for, the effect becomes negative. Overall, my study's results are mixed, and exhibit that the complex relationship between ESG and REIT performance requires further investigation.

Keywords: REIT, Environmental, Social and Governance (ESG), Corporate Social Responsibility (CSR), U.S. Market, Performance

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Título: Fatores Ambientais, Sociais e de Governança e o Desempenho de Fundos de Investimento Imobiliário: Um Estudo do Mercado dos Estados Unidos.

Resumo

Fundos de investimento imobiliário tem sido ativamente encorajados a investir em atividades relacionadas com a Responsabilidade Social Empresarial (RSE) e nos fatores Ambientais, Sociais e de Governança (ASG), apesar do seu considerável custo financeiro.

Os estudos empíricos existentes apresentam resultados dispares. Existem índices que os investimentos em fatores de ASG promovem o desempenho em mercado dos fundos, aumentam o valor reputacional e a rentabilidade dos mesmos. Porém, também existe evidência que a relação entre estes fatores e o desempenho dos fundos em mercado é insignificante.

O objetivo deste estudo é perceber o efeito destes investimentos nos fundos imobiliários no mercado dos Estados Unidos. Utilizamos três métricas que contextualizam ao desempenho dos para medir o efeito destes fatores na cotação dos fundos.

Os resultados são consistentes com a literatura existente. Em alguns casos, os fatores têm um efeito significativo e positivo no desempenho dos fundos.

Quando introduzimos medidas de rentabilidade, dimensão e alavancagem para controlar diferenças na amostra de fundos, o efeito dos fatores ASG torna-se negativo.

O estudo demonstra que a relação entre desempenho em mercado destes fundos imobiliários e os fatores de ASG é complexo, e requer mais aprofundamento.

Palavras-chave: Fundo de Investimento Imobiliário, fatores Ambientais, Sociais e de Governança (ASG), Responsabilidade Social Empresarial (RSE), Mercados dos Estados Unidos, Desempenho

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1. Introduction

Environmental, social, and governance (ESG) framework has been a topic of interest for not just investors but financial, social researchers and regulators as well. This has been a long-lasting discussion of the 20th century which has taken a new turn in the 21st century following the pandemic. During the pandemic in 2020, sustainable investments amounted to a staggering \$35.3 trillion globally which was equal to 35.9% proportion of total investments (Chacon et al., 2022). McDougall (2020) also discussed the surge in international importance given to ESG funds and investments during the COVID-19 crisis as the level of risk attached to environmental issues has become evident. Overall, the ESG funds in the market were observed to perform better as compared to traditional funds despite the instability plagued in the market by the pandemic.

With the increasing relevance of ESG in the post-pandemic era, it is also crucial to understand the challenges of our time in financing further global sustainable development in some industries despite the recognized urgency. One of these industries is real estate, which is also accused of being responsible for environmental issues as buildings consume roughly 40% of the world's energy (Romjin, 2021). Therefore, in recent times the real estate industry has been engaged in pursuits of ESG, Responsible Property Investments (RPI) and Corporate Social Responsibility (CSR). Reports disclosing real estate investment trusts (REITs) sustainable activities have also documented that ESG investing has increased since the mid-2000s, as now there are more than 217 ESG-rated REITs as opposed to only 43 in 2005 (Erol et al., 2023) in different parts of the world such as UK, Australia and Canada. Statista (2023) also recently revealed the growing traction of ESG investments within REITs during and post-pandemic grew exponentially as the trend exhibited that in 2018 only around a third of the top 100 US REITs disclosed carbon reduction targets, whilst by 2022 this number increased to 64%. This suggests a significant shift as the top 100 REITs make up roughly 90% of the entire US REIT market. Disclosing ESG pursuits has increasingly become common, as there is a growing demand from investors, lenders and stakeholders, even in the real estate sector. This has made nearly 83% of the top 100 REITs incorporate sustainability goals in their 2022 annual reporting (Statista, 2023).

One of the many ways in which REITs disclose commitment to sustainability agenda is through green building certifications.

The study by Neo and Sting (2024) shows that of the top 100 REITs, 81% became certified green buildings in 2022. This strand of literature specifically centralizes on asset-level greenness. Hence many times REITs' sustainable investments are examined by measuring their property-level outcomes. The researchers often proxy ESG performance with environmental certifications such as LEED and Energy Star (Chacon et al., 2023).

Following the rising demand for ESG disclosure, many regulatory bodies have published stringent reporting guidelines which help to evaluate sustainability investments of REITs by ESG rating agencies against their peers to further promote proactive ESG management. These guidelines and reporting framework led to greater transparency highlighting REIT's operating model, environmental impact and contribution to climate change. Feng and Wu (2021) argue that this scrutiny has acted as a means for driving positive change to refine REITs' business practices while integrating ESG criteria into core operations and investment decisions. Consequently, ESG disclosure can demonstrably influence firm performance as concluded by many (Feng & Wu, 2021; Erol et al., 2023).

Another important observation in the literature relating to REITs' ESG aspects is their impact on their market valuation. Prior literature in this field has reported benefits for REITs who report greater ESG investments, also known as 'green' REITs. For example, US REITs which use sustainable materials for commercial properties, or energy efficient materials tend to have an improved operating and stock performance in terms of return on assets, return on equity and ratio of funds from operational to total revenue as compared to REITs which are less 'green' (Eichholtz et al., 2012). The same has been evidenced by Kim et al. (2013) and Sah et al. (2013) with different measures of firm performance and market valuation showing that commitment to ESG factors has led to higher returns on assets for real estate firms in the US. Devine et al. (2016) discuss the positive effect of sustainable investments on the firm valuation of real estate companies listed in the US and the UK. Accordingly, REITs who have higher sustainable investments such as ownerships of buildings with LEED, Energy Star and BREEAM (i.e., types of green building certification programs) in their portfolio are expected to have a higher market value relative to their net asset value (Romjin, 2021). Net asset value (NAV) is the net value of a firm calculated by deducting liabilities from assets.

It is an important measure for firms which represents the per-share value of a fund's underlying asset suggesting whether the ESG fund's assets are appreciating, potentially indicating a well-performing fund (Capozza & Lee, 1996). In this manner, the NAV measure provides a long-term underlying value of the REIT portfolio minus its liabilities.

While many studies have investigated the impact of REIT investments in ESG in terms of stock returns (Neo & Sting, 2024) and profitability (Feng & Wu, 2021), only limited studies have considered the impact of ESG investments of REITs on their net asset value as a measure of firm value. Also, there is limited evidence of measuring the effect of ESG factors on the price-to-funds from operations (P/FFO) ratio, which is specifically considered in the valuation of REITs (Beracha et al., 2022). Moreover, there are only a handful of studies which show the association of firm performance, value and ESG investments within the REITs industry post-pandemic.

Based on these research gaps, the current study aims to understand the impact of ESG pillars and aspects on REITs' performance, measured by share price, net asset value and P/FFO ratio in the US. Following this aim the study answers the following broad questions:

1. What is the effect of environmental, social and governance factors on the financial performance or valuation of US-based real estate investment trusts?
2. Do ESG factors influence financial performance and valuation when REITs' size, profitability and leverage are controlled?

The study finds a significant impact of ESG, and some of the ESG pillars and other factors on financial performance/valuation of US-based REITs. However, with respect to the direction of relationship, the study observes mixed results. In the case of NAV as an outcome, the effect of ESG score flips from positive to negative after adding control variables (size, profits, and leverage) in the model. However, the effect of ESG remain significantly positive before and after including control variables on REITs closing price.

This paper is divided into seven sections. The first section provides a research background and formulates research questions. It is followed by literature review, which evaluates relevant theories and empirical evidence related to the current study. The study further provides details of the methodology and the data, including data extraction and variables' description. It also presents frequency analysis and descriptive statistics. Section 5 covers results, which include correlation and regression analysis. The final sections of the study provide discussion, conclusion, and limitations of the study.

2. Literature Review

2.1. Theoretical Framework Concerning ESG & Firm Value

In recent years, decision-making regarding the allocation of resources has become increasingly complicated for managers as their companies are not only assessed on the financial consequences of the decisions but also on how these decisions or business practices manage a set of societal expectations. ESG has been considered a non-financial indicator that is used to identify positive corporate practices in the domains of environment, social responsibility, ethics and corporate governance (Quintiliani, 2022). However, there has been a long overdue debate underpinning the impact ESG practices have on business performance, where one school of thought suggests the negative relationship between ESG activities and a firm's financial outcome, namely Shareholder Theory. Whereas the other, Stakeholder Theory advocates that ESG practices contribute to positive financial outcomes in organizations (Nguyen et al., 2022).

The former is established on the idea that due to the agency problem (i.e., which represents the conflict between shareholders and managers), the managers are assumed to invest in ESG factors at the expense of shareholders' profit as they need to be answerable to the regulatory bodies and the consumers (Barnea & Rubin, 2010). Krüger (2015) discusses that these sustainable investments at one point exceed the costs that are weighed against the added benefits. Consequently, firms regarded as high ESG-rated organizations signal overinvestment of funds in sustainable activities therefore experiencing lower shareholder value in case of crisis such as a product recall. A high ESG rating is frequently taken as a marker of a strong commitment towards the social and environmental responsibility of delivering fair value to customers and society at large. However, at times of crisis, such as product recall, the customers tend to question the quality of products and ethical practices of the business, thus their actual ESG rating and performance. Overinvesting in ESG activities also limits companies' free cash flow of business, so they might have fewer assets to reinvest efficiently in (Nguyen et al., 2022). Overall, this leads to lower firm value under the shareholder theoretical framework for firms who practice high ESG investments.

On the contrary, the stakeholder theory argues that investing in ESG practices can be beneficial for companies, as it helps to enhance organizational performance.

The rationale behind this theory comes from the conflict-resolution hypothesis that claims investing in ESG factors could resolve the complex disputes between managers and non-investing stakeholders (Freeman, 2010). Following this hypothesis, the study of Yarram and Fisher (2021); and Cui et al., (2018) found that organizations who adopt stakeholder-friendly policies (i.e., adoption of sustainable activities, investment into environmental-friendly raw materials, greater transparency, improved ESG rating etc.) are observed to have fewer information asymmetries, which translates to a better perceived reputation of the firm in their market. Such factors also lead to long-term stakeholder commitment and a high rate of customer loyalty (Turker, 2009). Therefore, these firms tend to experience low costs of equity and debt (Yarram and Fisher, 2021; Nguyen et al., 2022) at the time of refinancing their business growth. As firms become reputable and credible for providing honest information and positively impacting society, they are also seen to outperform their competitors with low ESG ratings in the post-crisis period. This makes firms earning less volatile during periods of crisis as well. Overall, the stakeholder theory advocates for the premise that better ESG performance leads to higher firm value (Freeman, 2010).

Based on the contradicting theoretical frameworks, the current study aims to investigate which of the theories stands true for the US REITs investing in ESG factors based on empirical evidence.

2.2. The Concept of ESG in REITs

As discussed briefly in the Introduction, the real estate industry has been criticized largely for its contribution to carbon emission and greenhouse gasses. A United Nations report revealed that buildings represent 40% of global carbon dioxide emission (Romjin, 2021; Erol et al., 2023). Therefore, the industry is under considerable pressure from its stakeholders and investors to adopt sustainable practices that compensate for its negative impact on society and the environment. This has put REITs under a special lens to fulfil their social responsibility of decarbonization, making environmental factors the most important out of the overall ESG factors. Consequently, most of the research concerning REITs has focused on the environmental aspect of ESG, specifically the proportion of portfolios that include environmentally certified properties in real estate companies (Chacon et al., 2022; Neo & Sing, 2024).

Following this strand of literature, the ‘green mark’ certification on buildings signals positive performance of REITs in generating more sustainable performance and thus leads to premium pricing relative to buildings without green certification (Neo & Sing, 2024). An earlier study by Eichholtz et al., (2012) tested US REITs operating and stock performance from 2000 to 2011 to examine the financial impact of ‘green’ properties. Accordingly, the authors found that a ‘green’ label on commercial buildings yields a higher rent and greater property value in the US, which increases firm profits leading to the conclusion that it is possible to balance environmental concerns and high returns. The same trend was observed in the commercial buildings of Singapore, where the ‘greener’ dwellings lead to higher rent even in times of rent recession and offer higher rental lease renewal (Deng et al., 2012; Cajias & Piazzolo, 2013). Buildings with ‘green’ certifications are also known to be more energy efficient, generating higher returns and rental income than traditional non-green buildings. At the same time, however, buildings which would qualify for green certification require high construction costs and materials, which have been a cause for concern for many REITs trying to invest in ESG factors. Hence, some REITs go beyond the conventional practice of green building and expand their environmental investment through other affordable means. These may include activities like adopting biodiversity and land conservation, utilizing eco-friendly designs for homes and buildings, issuing green bonds for costly sustainable projects, promoting emissions reductions and sustainable communities within their properties (Erol et al., 2023).

With respect to the social aspect of ESG, REITs have been recently found to be more accountable to their internal stakeholders, such as employees. The social performance of firms can be improved in multiple ways such as by ensuring that the workforce is inclusive and diverse, supporting and contributing to diverse communities, ensuring that employees are working in a safe office environment, and encouraging employees to volunteer in the community well-being programs (IEA, 2019). Another way that REITs have improved their ESG rating in recent years is through focusing on policies which promote good governance practices. Good governance practices, as defined by global databases like Morningstar and S&P include high transparency and accountability to disclose concerning matters in high-quality reporting, discouraging fraud and bribery, reducing potential conflicts of interest between two parties, and equity through fair compensation policies (Erol et al., 2023).

A combination of these frameworks often helps ESG-rated REITs to be considered transparent, credible, and sustainable in the market, which increases their reputation and value.

The way REITs invest into ESG factors to improve social and governance policies may be similar, investment into environmental factors for decarbonization may vary depending on the size of the firm and their portfolio. For example, residential REITs often prefer developing green lease agreements and green housing schemes to exhibit their sustainable investments. On the other hand, retail REITs go for construction processes which reduce greenhouse gas emissions within their operations such as site selection and maintenance (Nareit, 2019).

2.3. REITs ESG Investments and Impact on Firm Value and Performance

Even though extensive research has been conducted on factors of ESG investment and corporate financial performance in the REITs industry, knowledge regarding the impact on firm value has been scarce with limited studies in this spectrum (Noguera, 2020; Aroul et al., 2023). Previous studies in this regard have primarily focused on one of the ESG factors, either the environment or corporate governance (Campbell et al., 2011; Noguera, 2020) and the results have been mixed. For example, one of the few studies focusing on firm value investigated the impact of governance practices in REITs in the US (Noguera, 2020). The author studied the premise of corporate governance practices through board gender diversity in US REITs to test its impact on firm value. The sample included 20 years of data from 1999 to 2019. Governance practices were indicated through board gender diversity while return on assets (ROA) has been used as the proxy for REIT value. The results showed that the presence of gender diversity on the board as an indicator of good corporate governance practice does not impact REIT value but has a significant and positive impact on REIT performance (Noguera, 2020). Other studies found in the literature mostly included the impact of corporate governance practices in REITs on firm performance (Campbell et al., 2011; Ghosh & Petrova, 2021).

More relevant research led by Aroul et al., (2023) focused on all three aspects of ESG investments as independent variables to test the impact on firm value of real estate investment trusts.

Firm value indicators in the study included the ratio of market capitalization to total assets (Tobin's Q), and the market value of a firm divided by total assets (Firm Q). Other factors considered were cost of debt, financial flexibility, operation efficiency and performance.

The study employed data from the period 2009 to 2021, which suggested that high scores in environmental and governance factors predict improved firm value, whereas investment in social factors negatively predicts firm value. The study also revealed that environmental scores were observed to reduce the cost of debt and increase financial flexibility, operating efficiency, and performance. On the contrary, social scores showed opposing effects with an increase in the cost of debt and a reduction in financial flexibility as well as operating performance. Finally, governance scores were seen to positively impact operating efficiency (Aroul et al., 2023). Even though this research does not account for net assets value (NAV) as an indicator of firm value, it still provides a valid base for the current study to explore the relationship between alternative financial metrics and firm value.

One of the recent studies also evaluating the overall spectrum of ESG factors was considered (Erol et al., 2023). Here, the authors examine the impact of ESG investing on financial performance instead of REITs' value. The firm performance indicators used included excess return, risk-adjusted excess return, and systematic risk. On the other hand, environment, governance, and social-pillar scores were treated as independent variables separately and together as 'ESG total score'. The authors used a sample of 234 ESG-rated REITs from the US, Australia, UK, Canada, and Japan. The results confirmed that REITs investing highly in the environmental aspect of the ESG framework experience high financial costs, which depletes capital and other financial resources, leaving the company with decreasing market returns. At the same time, it was also found that REITs ignoring the social aspect of ESG investments incur lower implicit costs but lead to higher explicit costs and competitive disadvantage (Erol et al., 2023).

Similarly, Neo and Sing (2024) also focused on the overall ESG nexus, however, they checked the impact on REIT stock performance and whether climate change risk impacts ESG-rated REITs differently than non-ESG-rated REITs. The study employed a sample of 413 REITs from multiple developed countries including the US from a period of 2018 to 2022. The empirical tests revealed a negative correlation between the stock returns of REITs and ESG scores.

It was also found that REITs with high ESG ratings offer lower rewards for taking extra market risk to their investors.

This is not because the investment into ESG factors is riskier, but because their managers are getting high compensation for actively devising ESG investment strategies (Neo & Sing, 2024). A unique set of findings was also revealed by Geres (2023) who studied the impact of US REITs' environmental, social and governance performance on the financial performance indicators. The study undertook data from the period of 2012 to 2020 and employed funds from operations (FFO) and Tobin's Q as market and operations-based performance indicators. The results showed an insignificant impact of ESG performance on operating and stock performance. There was also a negative significant correlation between aged ESG scores, and the relative market value measured by Tobin's Q variable. These results contribute to the contradicting literature available on REIT's firm performance and ESG investments.

2.4. Hypotheses

Based on the above discussion, the current study develops the following hypotheses to be tested.

H1₀: There is a statistically insignificant impact of environmental, social and governance (ESG) factors on the financial performance and valuation of US-based REITs.

H1_a: There is a statistically significant impact of environmental, social and governance (ESG) factors on the financial performance and valuation of US-based REITs.

Moreover, the study considers including control variables in the study, including firm size, profitability, and leverage to assess whether controlling these variables influences the relationship between ESG factors and firm valuation.

H2₀: ESG factors insignificantly influence REITs' financial and market performance when size, profitability and leverage are controlled.

H2_a: ESG factors significantly influence REITs' financial and market performance when size, profitability and leverage are controlled.

3. Methodology

The current research adopts a quantitative methodology to examine the relationship between ESG factors and the US REITs' performance. The quantitative approach allows collection, analysis and interpretation of numerical data to test hypotheses (Choy, 2014). This methodology involves the use of statistical techniques to determine whether ESG factors significantly predict financial performance of US-based REITs. The details about the data, including variables, is provided in the next section of the study. This section focuses on the statistical techniques used to analyze the dataset.

The study first runs descriptive statistics and frequencies. Descriptive statistics are performed on ESG pillars and overall scores, and all financial indicators, measured in USD or as ratios. Descriptive statistics provide a concise summary of the dataset's main characteristics with the help of measures of central tendency, such as mean and median and measures of dispersion, such as standard deviation, minimum and maximum values (Bhaskar & Sudheesh, 2019). This study includes mean, standard deviation, minimum and maximum values, and 25th, 50th (median), and 75th percentiles. For the categorical variables (binary measurement) the study observes frequencies to explore the given data.

Before the main hypotheses testing, pairwise correlation analysis is performed as preliminary test to assess relationships between REITs' performance variables, and ESG main pillars and combined scores. It also helps detect multicollinearity between the explanatory variables. High multicollinearity could inflate standard errors and lead to unstable parameter estimates.

The hypotheses of the study are evaluated by a series of regression models. Regression analysis is considered as a powerful statistical technique for modelling and assessing relationships and making predictions (Aggarwal & Ranganathan, 2017). It is performed for three measures of REITs' financial performance: net asset value (NAV), price to funds from operations (PFFO), and closing stock price.

Starting with NAV, the first regression proposes the impact of ESG pillar scores on NAV,

$$\mathbf{NAV} = \beta_0 + \beta_1\mathbf{E_Score} + \beta_2\mathbf{S_Score} + \beta_3\mathbf{G_Score} + \varepsilon \text{ ----- (1)}$$

Where E_Score, S_Score, and G_Score are environmental, social and governance scores respectively.

It is followed by estimating the impact of ESG (combined) score on NAV. ESG (combined) score and separate pillars' scores are treated in different regression equations due to the issue of multicollinearity.

$$\mathbf{NAV} = \beta_0 + \beta_1\mathbf{ESG_Score} + \varepsilon \text{ ----- (2)}$$

The third regression equation includes ESG score with control variables: net profit margin, total assets (natural log), and debt to assets ratio. These three controls represent an REIT's profitability, size, and leverage, respectively.

$$\mathbf{NAV} = \beta_0 + \beta_1\mathbf{ESG_Score} + \beta_2\mathbf{NPM} + \beta_3\ln(\mathbf{TA}) + \beta_4\mathbf{DA} + \varepsilon \text{ ----- (3)}$$

Where NPM, TA and DA are net profit margin, total assets, and debt to assets, respectively.

The next regression model replaces ESG score with the three pillars (environmental, social and governance pillar scores),

$$\mathbf{NAV} = \beta_0 + \beta_1\mathbf{E_Score} + \beta_2\mathbf{S_Score} + \beta_3\mathbf{G_Score} + \beta_4\mathbf{NPM} + \beta_5\ln(\mathbf{TA}) + \beta_6\mathbf{DA} + \varepsilon \text{ ----- (4)}$$

The last NAV regression equation include several other ESG measures, including environment management team (EM), environment management training (EMT), environmental materials sourcing (EMS), environmental supply chain management (ESCM), environmental restoration initiatives (ERI), environmental partnerships (EP), environmental products (EPrd), environmental assets under management (EAUM), environmental project financing (EPF), supplier ESG training (SET), policy community involvement (PCI), corporate responsibility awards (CRA), CSR sustainability reporting (CSR_Reporting), ESG reporting scope (ESG_Scope), CSR strategy score (CSR_SS), corporate governance board committee (CGBC), and management score (MS), along with the control variables (: net profit margin, total assets (natural log), and debt to assets ratio).

$$\mathbf{NAV} = \beta_0 + \beta_1\mathbf{EM} + \beta_2\mathbf{EMT} + \beta_3\mathbf{EMS} + \beta_4\mathbf{ESCM} + \beta_5\mathbf{ERI} + \beta_6\mathbf{EP} + \beta_7\mathbf{EPrd} + \beta_8\mathbf{EAUM} + \beta_9\mathbf{EPF} + \beta_{10}\mathbf{SET} + \beta_{11}\mathbf{PCI} + \beta_{12}\mathbf{CRA} + \beta_{13}\mathbf{CSR_Reporting} + \beta_{14}\mathbf{ESG_Scope} + \beta_{15}\mathbf{CSR_SS} + \beta_{16}\mathbf{CGBC} + \beta_{17}\mathbf{MS} + \beta_{18}\mathbf{NPM} + \beta_{19}\ln(\mathbf{TA}) + \beta_{20}\mathbf{DA} + \varepsilon \text{ ----- (5)}$$

Similar regression models are proposed when PFFO is the dependent variable.

$$\mathbf{PFFO} = \beta_0 + \beta_1\mathbf{E_Score} + \beta_2\mathbf{S_Score} + \beta_3\mathbf{G_Score} + \varepsilon \text{ ----- (6)}$$

$$\mathbf{PFFO} = \beta_0 + \beta_1\mathbf{ESG_Score} + \varepsilon \text{ ----- (7)}$$

$$\mathbf{PFFO} = \beta_0 + \beta_1\mathbf{ESG_Score} + \beta_2\mathbf{NPM} + \beta_3\ln(\mathbf{TA}) + \beta_4\mathbf{DA} + \varepsilon \text{ ----- (8)}$$

$$\mathbf{PFFO} = \beta_0 + \beta_1\mathbf{E_Score} + \beta_2\mathbf{S_Score} + \beta_3\mathbf{G_Score} + \beta_4\mathbf{NPM} + \beta_5\ln(\mathbf{TA}) + \beta_6\mathbf{DA} + \varepsilon \text{ ----- (9)}$$

$$\mathbf{PFFO} = \beta_0 + \beta_1\mathbf{EM} + \beta_2\mathbf{EMT} + \beta_3\mathbf{EMS} + \beta_4\mathbf{ESCM} + \beta_5\mathbf{ERI} + \beta_6\mathbf{EP} + \beta_7\mathbf{EPrd} + \beta_8\mathbf{EAUM} + \beta_9\mathbf{EPF} + \beta_{10}\mathbf{SET} + \beta_{11}\mathbf{PCI} + \beta_{12}\mathbf{CRA} + \beta_{13}\mathbf{CSR_Reporting} + \beta_{14}\mathbf{ESG_Scope} + \beta_{15}\mathbf{CSR_SS} + \beta_{16}\mathbf{CGBC} + \beta_{17}\mathbf{MS} + \beta_{18}\mathbf{NPM} + \beta_{19}\ln(\mathbf{TA}) + \beta_{20}\mathbf{DA} + \varepsilon \text{ ----- (10)}$$

Lastly, for closing price, following are the regression equations.

$$\mathbf{Price} = \beta_0 + \beta_1 E_Score + \beta_2 S_Score + \beta_3 G_Score + \varepsilon \text{ ----- (11)}$$

$$\mathbf{Price} = \beta_0 + \beta_1 ESG_Score + \varepsilon \text{ ----- (12)}$$

$$\mathbf{Price} = \beta_0 + \beta_1 ESG_Score + \beta_2 NPM + \beta_3 \ln(TA) + \beta_4 DA + \varepsilon \text{ ----- (13)}$$

$$\mathbf{Price} = \beta_0 + \beta_1 E_Score + \beta_2 S_Score + \beta_3 G_Score + \beta_4 NPM + \beta_5 \ln(TA) + \beta_6 DA + \varepsilon \text{ ----- (14)}$$

$$\mathbf{Price} = \beta_0 + \beta_1 EM + \beta_2 EMT + \beta_3 EMS + \beta_4 ESCM + \beta_5 ERI + \beta_6 EP + \beta_7 EPrd + \beta_8 EAUM + \beta_9 EPF + \beta_{10} SET + \beta_{11} PCI + \beta_{12} CRA + \beta_{13} CSR_Reporting + \beta_{14} ESG_Scope + \beta_{15} CSR_SS + \beta_{16} CGBC + \beta_{17} MS + \beta_{18} NPM + \beta_{19} \ln(TA) + \beta_{20} DA + \varepsilon \text{ ----- (15)}$$

4. Data

The study utilized Refinitiv Eikon database to collect data related to ESG and financial performance of US-based REITs. It used the SCREENER app, from the app library, which allows scanning across global securities. The basic filters in the data search included country of exchange = United States of America, and TRBC Economic Sector Name = Real Estate. Therefore, all companies listed in the US real estate industry/sector (388) were part of the study's sample. With 10 years of data of each company, the study targeted a total sample size of $388 \times 10 = 3,880$. However, due to missing values, the target sample size for each variable was not achieved (see descriptive statistics). The data was accumulated in the SCREENER app by variables and years (separate columns) for the 388 companies (separate rows) in the form of a report. The table in Appendix A provides a description of the variables extracted from Refinitiv Eikon. It also includes the variables computed from the raw data.

The frequency analysis reveals that only 9.56% of the US REITs have an environment management team (60.46% data is missing). Similarly, only 8.63% of the companies provide environmental management training. A larger proportion of REITs have a policy to improve their good corporate citizenship (24.02%). Moreover, 38.48% of the REITs have a corporate governance board committee.

Table 1. Frequency Analysis

ESG Factors	%
Environment Management Team	9.56
Environment Management Training	8.63
Environmental Materials Sourcing	6.03
Environmental Supply Chain Management	7.68
Environmental Restoration Initiatives	3.2
Environmental Partnerships	9.25
Environmental Products	7.27
Environmental Assets Under Mgt	0.88
Environmental Project Financing	0.8
Supplier ESG training	1.47
Policy Community Involvement	24.02
Corporate Responsibility Awards	9.79
CSR Sustainability Reporting	15.31
Corporate Governance Board Committee	38.48

The descriptive statistics of the continuous variables further explores the dataset. The average ESG Score of the US REITs during the period of last 10 years (2014-2023) is 41.32, suggesting a C grade, i.e., ‘satisfactory’ ESG performance. ESG scores greater than 0.5 are considered ‘good’. The US REITs have performed better with respect to the governance pillar (M = 51.13) than the social pillar (M = 46.09) and environmental pillar (M = 28.52).

Table 2. Descriptive Statistics

Variable	n	Mean	S.D.	Min	0.25	Median	0.75	Max
Environmental Pillar Score	1546	28.52	29.19	0	0	18.16	53.4	95.99
Social Pillar Score	1546	46.09	18.64	2.6	31.51	43.1	60.22	95.71
Governance Pillar Score	1546	51.13	22.67	0.25	33.59	53.83	69.89	98.49
ESG Score	1546	41.32	20.49	1.6	25.13	37.1	58.23	92.19
Price Close USD	3169	50165.23	2.80E+06	0	3.25	15.25	34.21	1.60E+08
NAV	1860	25.52	50.58	-192.69	10.71	16.22	26.63	1209.36
Net Profit Margin	2818	-10.43	264.26	-1.2E+04	-0.08	0.08	0.25	395.15
Total Assets USD B	3008	5.71	12.3	0	0.26	1.9	6.07	131.58
Total Liabilities USD B	3006	3.94	10.22	-0.07	0.14	1.08	3.8	122.79
Debt to Asset	2991	69.89	2008.1	-0.17	0.47	0.62	0.8	1.00E+05
YTD Total Return	3154	4.93	155.17	-1	-0.13	0	0.11	7415.67
FFO Per Share	1308	3.41	10.76	-179.3	1.19	1.9	3.63	151
FFO Billions	1269	0.42	0.66	-1.22	0.08	0.21	0.49	5.33
Price to FFO	1308	16.86	49.98	-359.62	9.56	14.34	20.14	1475.75
PE Ratio	1934	24.03	170.33	-2428	3.95	16.95	37	2515
Number of Shares Outstanding Millions	1860	136.13	147.24	0.09	38.4	96.52	175.66	1729.26
ESG Reporting Scope	599	92.85	20.35	2.04	100	100	100	100
Management Score	1540	55.61	28.69	0.05	32.04	58.13	80.34	99.98

The descriptive statistics of the financial indicators show that the average NAV of the US REITs during the sample period is \$25.52 per share, while the mean price to FFO of the companies is \$16.86. The average closing share price of the REITs is very high (M = \$50,165), with a large standard deviation, suggesting outliers or extreme values in data. To resolve this issue, the study winsorizes continuous variables used in the analysis to reduce the influence of outliers. These variables are NAV, P/FFO, closing price, net profit margin, total assets (USD billion), debt to assets, PE ratio, and YTD total return. The variables are winsorized at 1%. This means that 1% of the values are trimmed from the lower and upper bounds of the distribution.

5. Results and Discussion

The variables listed in the descriptive analysis are used to determine the statistical impact of ESG on REITs' performance. The statistical tests used for inferential analysis include pairwise correlation and multiple linear regression analysis, which evaluate the models and hypotheses.

5.1. Correlation Analysis

Pairwise correlation helps to determine significant relationships between two variables at a time. It also reveals the direction (i.e., positive or negative direction) and magnitude of the relationship (i.e., weak, moderate or strong). As discussed earlier, pairwise correlation is performed on the main performance variables of REITs (PE ratio, price close, price to FFO ratio, RET) and ESG pillars, along with its combined score. The results are exhibited in the table below.

Table 3. Pairwise Correlation

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) PE Ratio	1.000								
(2) Price Close	0.136* (0.000)	1.000							
(3) Price to FFO	0.083* (0.003)	0.210* (0.000)	1.000						
(4) RET	0.017 (0.454)	-0.041* (0.023)	0.246* (0.000)	1.000					
(5) NAV	0.025 (0.290)	0.558* (0.000)	0.063* (0.025)	0.006 (0.796)	1.000				
(6) Environmental	0.047 (0.077)	0.225* (0.000)	-0.011 (0.713)	0.041 (0.105)	0.114* (0.000)	1.000			
(7) Social	0.061* (0.021)	0.220* (0.000)	0.002 (0.941)	0.040 (0.117)	0.110* (0.000)	0.790* (0.000)	1.000		
(8) Governance	0.026 (0.334)	0.100* (0.000)	-0.068* (0.027)	0.010 (0.699)	0.093* (0.000)	0.502* (0.000)	0.500* (0.000)	1.000	
(9) ESG Score	0.050 (0.059)	0.214* (0.000)	-0.029 (0.344)	0.036 (0.165)	0.122* (0.000)	0.925* (0.000)	0.873* (0.000)	0.758* (0.000)	1.000

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

According to the results, the environmental pillar score is significantly correlated to price close (closing price), $r = 0.225$, $p < 0.01$, and NAV (net assets value) of the REITs, $r = 0.114$, $p < 0.01$. The coefficient suggests that the correlation between investment into environmental factors and price close and NAV is positive, weak, and statistically significant. As for investment into social factors, the results show a significant and positive correlation with PE ratio, $r = 0.061$, $p < 0.05$, price close, $r = 0.220$, $p < 0.01$, and NAV, $r = 0.110$, $p < 0.01$.

With respect to the governance score, pairwise correlation suggests a positive and significant correlation with price close, $r = 0.100$, $p < 0.01$, and NAV, $r = 0.093$, $p < 0.01$.

It should also be noted that the governance pillar score is found to have a significantly negative relationship with price to FFO ratio, $r = -0.068$, $p < 0.05$. This means that investment in better corporate governance practices might negatively influence the price-to-FFO ratio.

The combined ESG score has a positive and significant correlation for only two performance indicators: price close, $r = 0.214$, $p < 0.01$, and NAV, $r = 0.122$, $p < 0.01$. Overall, the results show that individual ESG factors impact varying performance metrics of REITs.

5.2. Regression Analysis

Regression models are run with different combinations of factors as predictors, control variables, and dependent variables to test the hypotheses.

5.2.1. Impact on NAV

The first series of regression models (Table 4.) test the impact of a set of predictors on NAV. Here, the regression model with the outcome variable of NAV is performed five times with a different combination of ESG variables and controlled variables.

Table 4. Presents multiple linear regression results for predicting Net Asset Value (NAV). The independent variables of interest are Environmental Pillar Score, Social Pillar Score, Governance Pillar Score and ESG Score, which have been used alternatively in the regression models. The individual scores are included in the regression model (1) and (4), whereas the overall impact of ESG score is observed in model (2) and (3). Model (5) includes all other ESG factors. Control variables are progressively included in the regression models (3), (4) and (5), including the LN of total assets. All continuous variables are winsorized at the 1% level. *, **, *** denote statistical significance at the 90%, 95% and 99% levels, respectively.

MODEL VARIABLES	(1) NAV	(2) NAV	(3) NAV	(4) NAV	(5) NAV
Net Profit Margin			-0.6573 [-1.27]	-0.6674 [-1.29]	0.9158 [0.57]
Total Assets (Natural Log)			7.7691*** [13.78]	7.9235*** [13.87]	9.7756*** [9.95]
Debt to Assets			-26.869*** [-9.25]	-27.104*** [-9.33]	-46.692*** [-9.00]
Environment Management Team					-6.7746*** [-3.61]
Environment Management Training					-0.0153 [-0.01]
Environmental Materials Sourcing					8.3173*** [3.86]
Environmental Supply Chain Management					-6.6765*** [-3.17]
Environmental Restoration Initiatives					-3.9940* [-1.68]
Environmental Partnerships					2.2128 [1.10]
Environmental Products					-2.7397 [-1.35]
Environmental Assets Under Mgt					16.3121*** [3.65]
Environmental Project Financing					6.5713 [1.30]
Supplier ESG training					16.9576*** [5.18]
Policy Community Involvement					-4.2022 [-0.80]
Corporate Responsibility Awards					6.2035*** [3.30]
CSR Sustainability Reporting					1.0813 [0.13]
ESG Reporting Scope					-0.0206 [-0.48]
CSR Strategy Score					-0.0524 [-1.01]
Corporate Governance Board Committee					-23.382*** [-4.41]
Management Score					0.0013 [0.03]
Environmental Pillar Score	0.0464 [1.39]			-0.0550* [-1.72]	
Social Pillar Score	0.0507 [0.96]			-0.0248 [-0.50]	
Governance Pillar Score	0.0445 [1.42]			0.0283 [0.96]	
ESG Score		0.1364*** [4.68]	-0.0659** [-2.13]		
Constant	17.90*** [8.53]	18.208*** [13.25]	30.398*** [13.65]	28.822*** [10.82]	63.284*** [4.83]
Observations	1,449	1,449	1,437	1,437	590
R-squared	0.02	0.01	0.15	0.15	0.35

t-statistics in brackets
 *** p<0.01, ** p<0.05, * p<0.1

The first regression model assesses the impact of individual ESG factors on NAV. Here, the combined ESG score is not added as a predictor, considering its high multicollinearity with the individual pillars' scores. According to the results, the overall regression model is statistically significant in predicting NAV at 0.01 level, $F = 7.53$, $p < 0.01$. This suggests that the model comprising environmental, social, and governance pillar scores significantly explains the net asset value of REITs. Moreover, the r-square value of 0.02 indicates that the model explains a 2% variance in the dependent variable (NAV). However, observing individually, each ESG factor has an insignificant impact on NAV. This means that all three combined have a significant impact, but the impact may not be considerable individually.

The second regression model assesses the impact of the combined ESG score on NAV. The results show that the overall model is statistically significant at 0.01, $F = 21.92$, $p < 0.001$. The r-square value of 0.01 also suggests that a 1% variance is explained in the dependent variable. Individually, the ESG score has a significant and positive impact on the NAV of REITs. The coefficient (beta) of 0.136 means that an increase in the combined ESG score will also cause the net assets value to increase.

The third regression model assesses the same but includes net profit margin, total assets, and total debt-to-assets ratio as control variables to predict the impact of combined ESG scores on NAV when profitability, firm size, and leverage are controlled. The results for this model are also statistically significant, showing that the model comprising of combined ESG score and controlled variables significantly explains NAV, $F = 62.53$, $p < 0.001$. However, the ESG's coefficient shows a negative impact on NAV, $\beta = -0.065$, $p < 0.05$. This means controlling REITs' size, profitability, and leverage changes the ESG score from positive to negative. While controlling for these factors, the high investment in ESG could lead to lower NAV in REITs.

The fourth regression model assesses the impact of the individual ESG pillars and the same control variables on REITs NAV. The results find the significance of the overall regression model, $F = 42.29$, $p < 0.01$. The results also show a 0.15 r-square value, suggesting that the model explains a 15% variance in the dependent variable, NAV. Observing factors individually, the results show that after controlling for profitability, firm size, and leverage, only the environmental pillar score is significant out of the three ESG pillars, $\beta = -0.055$, $p < 0.01$.

However, the coefficient value shows that this impact is negative. This means increasing investment in environmental activities would reduce the net asset value of REITs.

The study also considers other ESG variables apart from pillar scores and combined scores, such as environment management team, training, material sourcing, supply chain management, supplier ESG training, number of corporate responsibility awards received by the REITs, etc. These are listed in the regression model above.

The results show that out of 17 ESG activities, only 9 have a significant impact on NAV of REITs when firm size, profitability and leverage are controlled. However, the significant impact of these variables varies in terms of direction. For example, 4 ESG activities have a significant but negative impact on NAV; these include environment management team $\beta = -6.774$, $p < 0.01$, environmental supply chain management, $\beta = -6.676$, $p < 0.01$, restoration initiatives, $\beta = -3.994$, $p < 0.01$ and corporate governance board committee, $\beta = -23.382$, $p < 0.01$. The remaining activities are observed to have a positive impact on NAV. This means that if REITs increase their investment in environmental materials sourcing, assets under management, supplier ESG training, and have more corporate responsibility awards, the impact on net assets value is positive.

5.2.2. Impact on PFFO

The regression analysis (Table 5.) is also performed on the outcome variable of price to funds from operations (PFFO). Similarly to the NAV regression analysis, the study tests a series of multiple linear regression models to assess ESG factors' impact on PFFO.

Table 5. Presents multiple linear regression results for predicting Price to Funds from Operations (PFFO). The independent variables of interest are Environmental Pillar Score, Social Pillar Score, Governance Pillar Score and ESG Score which have been used alternatively in the regression models. The individual scores are included in the regression model (1) and (4), whereas the overall impact of ESG score is observed in model (2) and (3). Model (5) includes all other ESG factors. Control variables are progressively included in the regression models (3), (4) and (5), including the LN of total assets. All continuous variables are winsorized at the 1% level. *, **, *** denote statistical significance at the 90%, 95% and 99% levels, respectively.

MODEL VARIABLES	(1) PFFO	(2) PFFO	(3) PFFO	(4) PFFO	(5) PFFO
Net Profit Margin			0.7774**	0.8291**	2.8131***
			[2.19]	[2.33]	[3.20]
Total Assets (Natural Log)			1.0985***	0.9164**	1.9185***
			[2.76]	[2.27]	[3.08]
Debt to Assets			-7.5452***	-7.8672***	-2.6395
			[-4.09]	[-4.26]	[-0.87]
Environment Management Team					0.5929
					[0.55]
Environment Management Training					-2.2968**
					[-2.10]
Environmental Materials Sourcing					-2.2400*
					[-1.78]
Environmental Supply Chain Management					1.1440
					[0.95]
Environmental Restoration Initiatives					-0.8495
					[-0.61]
Environmental Partnerships					1.6046
					[1.41]
Environmental Products					-0.1342
					[-0.12]
Environmental Assets Under Mgt					-1.8454
					[-0.47]
Environmental Project Financing					-3.7911
					[-1.05]
Supplier ESG training					0.3299
					[0.14]
Policy Community Involvement					1.5298
					[0.52]
Corporate Responsibility Awards					-0.5388
					[-0.47]
CSR Sustainability Reporting					12.2522***
					[2.63]
ESG Reporting Scope					-0.0332
					[-1.39]
CSR Strategy Score					-0.0100
					[-0.32]
Corporate Governance Board Committee					1.0434
					[0.28]
Management Score					-0.0301
					[-1.36]
Environmental Pillar Score	-0.0042			-0.0099	
	[-0.23]			[-0.53]	
Social Pillar Score	0.0337			0.0188	
	[1.11]			[0.61]	
Governance Pillar Score	-0.0472**			-0.0583***	
	[-2.51]			[-3.11]	
ESG Score		-0.0163	-0.0496**		
		[-0.95]	[-2.39]		
Constant	16.6679***	16.3441***	20.3313***	21.1636***	4.4525
	[13.27]	[19.11]	[14.95]	[12.66]	[0.59]
Observations	1,060	1,060	1,059	1,059	493
R-squared	0.01	0.00	0.03	0.03	0.10

t-statistics in brackets

*** p<0.01, ** p<0.05, * p<0.1

The first regression model comprises individual ESG pillar scores as predictors and PFFO as the dependent variable. The results of this model are marginally significant, suggesting that the regression model encompassing environmental, social, and governance pillar scores significantly explains PFFO at 0.1 level, $F = 2.25$, $p < 0.1$. The model's r-square value shows a 1% variance explained in the dependent variable. Moreover, the results reveal that only the governance pillar score has a statistically significant impact on REITs PFFO, $\beta = -0.04$, $p < 0.05$. However, this impact is negative, suggesting investment in governance activities would reduce PFFO. The remaining two ESG factors, environmental and social, are found to be insignificant.

The study also uses the combined ESG score in another linear regression model to achieve robust results. The results of this model are insignificant, $F = 0.90$, $p < 0.344$. Moreover, the p-value of the combined ESG score variable also shows an insignificant effect on PFFO. This means that the overall ESG score of REITs does not predict their valuation.

The same is tested again, but after controlling for REITs size, leverage, and profitability in the third linear regression model. The results show that the overall model is statistically significant at 0.01 level, $F = 7.59$, $p < 0.001$. Individually, the results also reveal a statistically significant impact of combined ESG score on PFFO after leverage, profitability, and size of REIT are controlled, $\beta = -0.04$, $p < 0.05$. However, the beta value exhibits that this impact is significantly negative, showing that higher investment in ESG reduces the PFFO of REITs if profitability, size, and leverage are treated as control variables. The results imply that the initial positive impact without control variables might be because of other factors like larger, more profitable companies with the resources to invest in high-end ESH initiatives. However, once the study accounts for these factors, there might be a cost associated with high ESG performance, leading to a reduction in REITs' net asset value.

The control variables are used again in the fourth regression model to analyze the impact of individual ESG pillar scores on PFFO. The results are significant for the overall model, suggesting that individual ESG pillar scores significantly explain PFFO, $F = 6.08$, $p < 0.001$. However, similarly to the first regression model, the individual results reveal a significant impact of governance pillar score on PFFO when controlling firm size, leverage, and profitability. The beta of -0.058 , however, shows a negative impact.

The study also predicts the impact of other ESG factors on PFFO while controlling for REIT size, profitability, and leverage. The regression model encompassing 17 ESG factors and 3 control variables is overall significant, $F = 2.63$, $p > 0.001$. Individually, only three other ESG factors significantly impact PFFO: CSR sustainability reporting, environmental management training and materials sourcing. However, only CSR sustainability reporting positively impacts the PFFO of REITs, $\beta = 12.252$, $p < 0.05$.

5.2.3. Impact on Price

To assess the impact of ESG scores on the performance of REITs, the study also includes the closing price of US REITs as the outcome in the regression analysis (Table 6.). A similar series of five regression models is run with different combinations of independent and control variables.

Table 6. Presents multiple linear regression results for Closing Stock. The independent variables of interest are Environmental Pillar Score, Social Pillar Score, Governance Pillar Score and ESG Score which have been used alternatively in the regression models. The individual scores are included in the regression model (1) and (4), whereas the overall impact of ESG score is observed in model (2) and (3). Model (5) includes all other ESG factors. Control variables are progressively included in the regression models (3), (4) and (5), including the LN of total assets. All continuous variables are winsorized at the 1% level. *, **, *** denote statistical significance at the 90%, 95% and 99% levels, respectively.

MODEL VARIABLES	(1) Price	(2) Price	(3) Price	(4) Price	(5) Price
Net Profit Margin			0.8434 [0.87]	1.0068 [1.04]	18.7306*** [2.90]
Total Assets (Natural Log)			13.6395*** [8.12]	12.9049*** [7.60]	33.2718*** [8.36]
Debt to Assets			-7.4860 [-0.84]	-6.4484 [-0.72]	36.4952* [1.74]
Environment Management Team					-17.4328** [-2.30]
Environment Management Training					-14.4307* [-1.90]
Environmental Materials Sourcing					16.8246* [1.94]
Environmental Supply Chain Management					13.7353 [1.62]
Environmental Restoration Initiatives					-17.7620* [-1.85]
Environmental Partnerships					15.0834* [1.85]
Environmental Products					-38.8151*** [-4.75]
Environmental Assets Under Mgt					17.0842 [0.95]
Environmental Project Financing					10.0082 [0.49]
Supplier ESG training					31.2420** [2.36]
Policy Community Involvement					21.1595 [0.99]
Corporate Responsibility Awards					12.2704 [1.62]
CSR Sustainability Reporting					14.6029 [0.39]
ESG Reporting Scope					-0.2272 [-1.32]
CSR Strategy Score					-0.0727 [-0.35]
Corporate Governance Board Committee					-45.3507** [-2.12]
Management Score					-0.0438 [-0.30]
Environmental Pillar Score	0.3576*** [3.55]			0.1984* [1.95]	
Social Pillar Score	0.4587*** [2.91]			0.2998* [1.91]	
Governance Pillar Score	-0.1066 [-1.16]			-0.1527* [-1.67]	
ESG Score		0.7417*** [8.56]	0.3518*** [3.56]		
Constant	21.1372*** [3.44]	16.3595*** [4.08]	16.1719** [2.35]	19.5423** [2.37]	11.9144 [0.22]
Observations	1,531	1,531	1,518	1,518	591
R-squared	0.06	0.05	0.09	0.10	0.23

t-statistics in brackets
*** p<0.01, ** p<0.05, * p<0.1

Initially, the study examines the impact of individual ESG pillar scores on the closing price of REIT equities. According to the regression results, the model is statistically significant, $F = 30.28$, $p < 0.001$. The results also reveal the individual impact of each pillar score on price. It shows that environmental, $\beta = 0.3576$, $p < 0.001$, and social pillar score, $\beta = 0.4587$, $p < 0.01$, have a statistically significant impact on the closing price of REITs stock. The impact is significantly positive, suggesting that an increase in the investment in environmental and social activities would lead to an increase in the closing price of the stock in the market, thereby positively impacting REITs' market value. The governance pillar score is seen to have an insignificant impact.

The study also examines the impact of combined ESG scores on price in the second regression model. As per the results, the overall model predicting the impact of combined ESG score on price is statistically significant, $F = 73.20$, $p < 0.001$. The r-square value 0.05 suggests a 5% variance explained in the closing stock price. Furthermore, the individual impact is also significant and positive, with a beta value of 0.7417, suggesting that an increase in overall ESG investments or rating would lead to greater closing stock prices and improved market valuation of REITs.

Another regression model is tested with combined ESG score, including firm size, leverage, and profitability within the model to examine the impact on price. The results determine that the overall model is statistically significant, $F = 37.06$, $p < 0.001$. This means that the predictors' score significantly explains the closing price of REIT stock when firm size, leverage, and profitability are controlled. The individual impact is also significantly positive, $\beta = 0.3518$, $p < 0.01$.

The fourth regression examines the impact of separate ESG pillar scores when the same controlled variables are added to the model: firm leverage, profitability, and size. According to the results, the overall model is statistically significant, $F = 26.47$, $p < 0.001$. Individual results reveal that all the ESG factors significantly impact the closing price after adding the control variables to the model. However, the impact is significant at 0.1 level, and the governance pillar score is observed to have a negative impact, $\beta = -0.152$, $p < 0.1$. The remaining two factors of the ESG pillar positively impact price, determining that an increase in environmental and social factors may lead to higher REIT value.

The last regression model assesses the impact of other ESG factors and activities on price when firm size, leverage, and profitability are controlled. The results show that the overall model encompassing the 17 other ESG factors is statistically significant, $F = 8.29$, $p > 0.001$. Individual results reveal that the significance level of most factors is low at 0.1 and negative. For example, the model predicts the negative impact of the environmental management team, $\beta = -17.432$, $p < 0.1$, management training, $\beta = -14.430$, $p < 0.1$, restoration initiatives, $\beta = -17.762$, $p < 0.1$, products and corporate governance board committee, $\beta = -45.350$, $p < 0.1$, negatively impact price of REITs.

6. Discussion & Conclusion

Drawing from the correlation and regression results, the alternate hypotheses are accepted in some cases but rejected in others. This highlights the mixed results and exhibits a complex relationship between ESG investments and REIT performance. For example, the combined ESG score shows a positive and significant impact on NAV and price, thereby accepting $H1_a$ but an insignificant impact on PFFO would reject $H1_a$. After adding control variables like firm-specific factors like size, profitability, and leverage, the ESG scores reveal potential drawbacks that suggest a negative impact on operational performance (PFFO) and NAV. However, only a positive effect is observed on closing prices with and without controls. The study, therefore, partially accepts $H2_a$. In the case of NAV, results flipped to negative after adding control, suggesting that the initial relationship was probably spurious as large, more profitable, and less leveraged firms (REITs) could have higher ESG scores due to higher resources to invest in ESG initiatives. Controlling these firm characteristics might have allowed observing the independent or true effect of ESG on NAV.

Looking at the results through the lens of literature, it can be said that the mixed findings of Geres (2023) and Neo and Sing (2024) stand true. Geres (2023) concluded that ESG scores have an insignificant impact on operating and stock performance. This goes together with the results of the current study, as the regression model predicted an insignificant impact of combined ESG score on operational performance (PFFO).

The individual ESG scores also had an insignificant impact on REITs' valuation indicator of NAV. Furthermore, the current study's results align with Neo and Sing (2024) as the literature discussed earlier, exhibiting a negative correlation between ESG investment and REIT stock returns. In the present regression models, ESG negatively impacts NAV and PFFO after accounting for firm-specific factors like size, profitability, and leverage. The results imply that ESG scores do not have a straightforward or direct impact on the REITs' operational performance or firm value.

Following these results, it can also be said that larger, more profitable, or less leveraged firms might inherently have high ESG scores, as the same was demonstrated by Erol et al. (2023). Erol et al. (2023) discussed that depending on firm size, investment into environmental factors of decarbonization increases, therefore improving the firm's corporate governance policies and corporate social performance. However, once these factors, like firm size, are controlled, higher ESG scores might incur greater potential costs or inefficiencies associated with maintaining the standards set by elevated ESG investments, as observed in the regression results where ESG negatively impacts NAV. Therefore, these findings follow the theoretical framework of the agency problem discussed by Nguyen et al. (2022). The theory discusses how overinvestments in ESG activities limit firms' free cash flow, leading them to have fewer assets to reinvest in projects with higher returns. This also might be one of the reasons why the current regression results show that US REITs face a reduction in net asset value as their ESG scores grow.

The literature also discusses the individual impact of each ESG component, which supports the current study's findings. For example, the regression models predicting PFFO and NAV show that the individual impact of environmental, social, and governance factors has been insignificant or negative in the case of US REITs. This is also seen in the study of Noguera (2020), who explained that good corporate governance practices, such as board gender diversity, have an insignificant impact on the value of REITs. The insignificant impact of the corporate governance board committee is also noticed in the regression models of PFFO, and a negative impact is observed on the NAV and closing price of US REITs. Governance is not observed to positively impact any of the three REITs' value and operational performance indicators. This finding challenges the literature presented by Aroul et al. (2023), which showed the positive impact of governance scores on operational efficiency.

Interestingly, the second factor, the social score of ESG, is observed to have a constant insignificant impact on NAV and PFFO, except for price, which impacts closing price significantly and positively. An insignificant impact is observed on NAV and PFFO with and without controlled variables. The insignificant results suggest that the social initiatives of REITs may not directly enhance the underlying value of REIT assets or translate into measurable financial performance improvements from operational cash flows. However, the positive impact on price suggests that social initiatives of REITs might increase their reputation and credibility in the market, attracting more investors and leading to a higher stock price. This would also automatically be perceived as reducing risk related to community and long-term customer retention, leading to a REIT stock premium. These results follow the stakeholder theory discussed by Yarram and Fisher (2021) and Cui et al. (2018). The literature advocating for the theory argues that investment into factors associated with socially responsible behavior and other initiatives leads to a higher reputation in the market and mitigates risks in periods of crisis. However, the results do not align with the findings of Aroul et al. (2023) and Erol et al. (2023), which showed a negative impact of social scores of ESG on operating profits and competitive advantage.

Finally, the environmental aspect of ESG scores shows a positive impact on price but a negative impact on NAV when firm size, leverage, and profitability are controlled. As discussed earlier, the negative effects after accounting for firm size, leverage, and profitability might be due to the underlying factors of high costs incurred to implement an environmentally friendly portfolio, such as energy-efficient buildings, renewable energy sources, and waste reduction. As studied in the literature, these initiatives are costly and provide upfront investment to gain green certificates and attract buyers (Chacon, 2023; Eichholtz et al., 2012). It could also be that funds diverted to environmental projects limit investments in other high-return projects. This is also why the current regression models negatively impact NAV by environmental management teams, supply chain management, and restoration initiatives. However, despite the negative impact on NAV, the positive impact on the closing price of REIT equities suggests that US market investors prefer REITs with high-rated environmental scores. This stands true in the general literature, which explains why the concept of ESG investing became common among REITs (Kim et al., 2013; Feng & Wu, 2021).

In summary, the results show that the regression models highlight a complex relationship between ESG scores and REIT performance and valuation metrics. While higher ESG scores negatively impact NAV when controlling for firm-specific factors like size, profitability, and leverage, they positively influence the closing price of REIT equities. This implies that while ESG-based initiatives might involve significant costs affecting direct asset values, the market perceives such initiatives to be positive and therefore proves to be beneficial in reducing risks and enhancing future potential.

Eventually, this drives up the stock prices. In terms of managerial implications, these findings shed light on the importance of balancing the initial costs of ESG-related projects as they have the potential to enhance market valuation and attract investors in the long run. Furthermore, investors should go beyond buildings' 'green' certifications and consider other social and governance initiatives REITs take. REITs can also consider these investments as they are potentially costly in the short run but can lead to higher market valuation and align with the current growing preference for sustainable investments.

7. Limitations of the Study & Future Recommendations

Based on the mixed results of the current study, future research in the same field is recommended to go beyond the scope of US REITs and focus on the long-term impact of ESG investments on market performance of the companies. While the current study offers valuable insights into the relationship between ESG factors and the performance of US REITs, several limitations should be acknowledged. These limitations are based on the research methodology, data, and tools used for statistical analysis. For example, the study employs quantitative analysis to ensure statistical rigor. However, the quantitative approach overlooks the subjective perspective and contextual factors that might influence the impact of ESG factors on REIT performance. Quantitatively, the study focuses on objectivity, showing to what extent the ESG scores of REITs impact their market valuation and performance, but fails to address the reason for it in the context of the US market.

The use of a qualitative research approach in this methodology would be ideal as it would provide deeper insights into the underlying relationship of ESG, net assets value, and profitability of US-based REITs as the reasons for significant and insignificant relationships may differ from region to region based on financial and disclosure policies.

Additionally, the focus on only US REITs is also related to the limitation of generalizability, which restricts the scope of the current research. This means that the findings of the current study are specific to US REITs and may not stand true to REITs in other regions with different regulatory policies, market structures, and investor behaviors. These findings cannot be generalized to the global REITs beyond the scope of the current study.

In this context, the present research also focuses on a selected set of performance and valuation indicators such as NAV, price-to-earnings ratio, net profit margin, etc. The literature reviewed earlier shows varying types of financial metrics and dimensions that researchers have used, such as returns or risk-adjusted returns. The use of additional variables would make the study more complicated but also provide a more comprehensive understanding, which might not be covered in the current analysis.

With respect to the explanatory variables employed, the study lacks external factors that reflect market volatility. REIT's performance may not only be affected by its ESG investments but also by various market conditions, economic factors, and external events that have not been considered in the present research. This is also observed in the existing literature, which has discussed the impact of the pandemic (McDougal, 2020; Chacon et al., 2022; Statista, 2023) on ESG investments and the performance of different REITs bonds. Hence, it should be noted that certain trends within the current findings might not be explained as they would have occurred from the potential impact of macroeconomic trends, policy changes, and/or unforeseen market downturns that could affect REIT performance even independent of ESG scores.

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Appendix A – Table of variables and definitions

Variables	Description	Source
Environmental Pillar Score	It measures the impact of a company on living and non-living natural systems, including the air, land, and water (and complete ecosystems).	Refinitiv Eikon
Social Pillar Score	It measures capacity of a company to generate loyalty and trust with its workforce, customers, and society, by the use of best management practices.	Refinitiv Eikon
Governance Pillar Score	The corporate governance pillar measures processes and systems, which ensure that the company's executives and board members act in the long-term shareholders' best interests.	Refinitiv Eikon
ESG Score	Refinitiv ESG Score is an overall company score, which is based on environmental, social and corporate governance pillars' self-reported information.	Refinitiv Eikon
Price Close (USD)	The latest available closing price.	Refinitiv Eikon
Net Asset Value (NAV)	NAV is a company's assets minus liabilities (Capozza & Lee, 1996). Considering the NAV formula provided by Capozza and Lee (1996), it is calculated as $NAV = (Total\ assets - Total\ liabilities) / Number\ of\ shares\ outstanding$. These variables are extracted from Refinitiv Eikon.	Author's own estimation.
Net Profit Margin (%)	It is defined as the income available to common excluding extraordinary items divided by total revenue.	Refinitiv Eikon
Debt to Asset Ratio	Debt to asset ratio measures a company's leverage. It is computed by the formula: $Debt-to-asset = Total\ assets / Total\ liabilities$	Author's own estimation.
YTD Total Return	The YTD total return includes the change in price and any relevant dividends over the period of the year to date.	Refinitiv Eikon
PE Ratio	PE ratio is the current share price relative to its EPS	Refinitiv Eikon
Price-to-FFO	It is ratio of share price divided by funds from operations per share (Beracha et al., 2022). In this study, it is calculated using the formula: $P/FFO = Closing\ price / FFO$ FFO Per Share is a measure used for real estate firms and other investment trusts to define the cash flow from trust operations (amortization and depreciation are added back) (Refinitiv Eikon)	Author's own estimation.
Environment Management Team	Does the company have an environmental management team? (binary variable, yes/no)	Refinitiv Eikon

Environment Management Training	On environmental issues, does the company train its employees? (binary variable, yes/no)	Refinitiv Eikon
Environmental Materials Sourcing	To source or eliminate materials, does the company claim to use environmental criteria? (binary variable, yes/no)	Refinitiv Eikon
Environmental Supply Chain Management	Does the company use environmental criteria (such energy consumption, ISO 14000, etc.) in the suppliers' selection process? (binary variable, yes/no)	Refinitiv Eikon
Environmental Restoration Initiatives	To restore the environment, does the company provide information or report on company-generated initiatives? (binary variable, yes/no)	Refinitiv Eikon
Environmental Partnerships	Does the company report on initiatives or partnerships with organizations focused on improving environmental issues? (binary variable, yes/no)	Refinitiv Eikon
Environmental Products	Does the company report on at least one service or product line that is designed to have positive effects on the environment? (binary variable, yes/no)	Refinitiv Eikon
Environmental Assets Under Mgt	Does the company report on assets under management which consider environmental factors or environmental screening criteria in the investment selection process? (binary variable, yes/no)	Refinitiv Eikon
Environmental Project Financing	Does the company claim to assess projects based on environmental or biodiversity risks? (binary variable, yes/no)	Refinitiv Eikon
Supplier ESG training	Does the company provide training in ESG factors for its suppliers? (binary variable, yes/no)	Refinitiv Eikon
Policy Community Involvement	Does the company have a policy to improve its good corporate citizenship? (binary variable, yes/no)	Refinitiv Eikon
Corporate Responsibility Awards	Has the company received an award for its ESG activities? (binary variable, yes/no)	Refinitiv Eikon
CSR Sustainability Reporting	Does the company publish a separate H&S/Sustainability/CSR report or publish a related section in its annual report? (binary variable, yes/no)	Refinitiv Eikon
ESG Reporting Scope	The proportion of activities of a company covered in its Environmental and Social reporting.	Refinitiv Eikon
CSR Strategy Score	A company's daily decision-making processes integrates economic, social and environmental dimensions.	Refinitiv Eikon
Corporate Governance Board Committee	Does the company have a corporate governance board committee? (binary variable, yes/no)	Refinitiv Eikon
Management Score	It measures effectiveness and commitment of a company towards following best practice corporate governance principles.	Refinitiv Eikon

